

McTMA



Purpose:

Help traffic managers anticipate future demand across multiple Centers and regulate traffic flow into the TRACON.

Users:

- En route Traffic Management Coordinators (TMCs)
- En route radar controllers
- Terminal area TMCs

Field Sites:

New York, Cleveland, Boston, and Washington ARTCCs, Philadelphia TRACON and the ATCSCC

Operational Results:

- TMA Single Center (TMA-SC) testing at Fort Worth ARTCC achieved reduced delays of 2 min. per arrival aircraft and increased capacity by 5%.
- TMA-SC is operational at 7 ARTCCs as part of the FAA's Free Flight Phase 1 (FFP1) program.
- The FAA estimated a 3-5% increase in throughput as well as reduced internal departure delays at several of the FFP1 sites.

Future:

- McTMA field trials will take place January 2003 through June 2004.
- McTMA is an integral component of the FAA's Free Flight Phase 2 Program.

Multi-Center Traffic Management Advisor



Overview

Traffic management coordinators (TMCs) and en route (Center) air traffic controllers manage and control arrival traffic into busy terminal areas (Terminal Radar Approach Controls, or TRACONs). On the basis of the current and predicted future traffic flow, the TMC creates a plan to deliver the aircraft, safely separated, to the TRACON at a rate that fully subscribes, but does not exceed, the capacity of the TRACON and destination airports. The Traffic Management Advisor for Single Center (TMA-SC), a decision-support tool (DST) developed at NASA Ames and deployed as part of the FAA's Free Flight Phase 1 program, assists the Center TMCs and air traffic controllers in flow management planning.

Current development underway extends the TMA-SC capability under Multi-Center TMA (McTMA), a DST that will expand the TMA planning horizon and facilitate traffic flow management and coordination between multiple ATC facilities. McTMA will help to address congestion issues where more than one Center affects traffic to a terminal area. These complex traffic flows, such as in the Northeast Corridor of the U.S., traverse narrow, congested sectors and require planning horizons beyond that encountered in airspaces where TMA-SC is most appropriate. The current flow restrictions that are implemented to manage this traffic can be inefficient, resulting in no-notice holding and overly restrictive miles-in-trail operations.

McTMA will enable an effective communications infrastructure between facilities to share predictions of aircraft arrivals, provide improved flow visualization capabilities, and generate schedules for traffic through multiple Centers. TMCs will be able to better address congestion issues before they become no-notice holding situations. McTMA will also enable time-based metering to allocate delays to the most appropriate sectors, whether in a first- or second-tier Center.

The McTMA Schedule

For each arrival aircraft in the system, McTMA computes the undelayed estimated time of arrival (ETA) to sector and Center boundaries, meter fixes, the final approach fix and the runway threshold. The aircraft are then sequenced on a first-come, first-served basis according to their ETAs at meter fixes and user-entered sequence constraints. Scheduled times of arrival (STAs) at the meter fixes are then computed to meet user-defined scheduling constraints.

McTMA creates a schedule well in advance of when traffic flow management decisions need to be implemented, and conveys this information to TMCs through graphical displays. In doing so, McTMA helps TMCs to devise a traffic plan and translate the traffic plan into sequences and STAs at the meter fixes, maximizing airport and TRACON capacity without compromising safety. McTMA displays the STAs to the Center controllers on their radar displays, where controllers determine the best strategies for meeting the schedule. McTMA continually updates its schedule at a rate comparable to the radar update rate in response to changing events (such as amount of traffic or changes in the winds) and controller and/or TMC inputs.

Initial Research Efforts

Current McTMA research, which is supported by NASA's Airspace Systems Program, will focus on arrivals into Philadelphia TRACON (PHL) that traverse New York, Washington, Cleveland, and Boston Centers. McTMA displays will be provided to the five facilities, enabling them to visualize the traffic demand into PHL.